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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/596,351	06/09/2006	Otto Carlowitz	03100309AA	5548
30743	7590	01/20/2011	EXAMINER	
WHITHAM, CURTIS & CHRISTOFFERSON & COOK, P.C. 11491 SUNSET HILLS ROAD SUITE 340 RESTON, VA 20190			NGUYEN, NGOC YEN M	
			ART UNIT	PAPER NUMBER
			1734	
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			01/20/2011	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/596,351	<b>Applicant(s)</b> CARLOWITZ ET AL.	
	<b>Examiner</b> Ngoc-Yen M. Nguyen	<b>Art Unit</b> 1734	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 November 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-8,10-12,15 and 16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8,10-12,15 and 16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 12, 2010 has been entered.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-8, 10-12, 15-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, in the "removing" step, the adhesions are defined as being formed on the heat storage material from oxidation of said organosilicon compound but there is no limitation in the claim to indicate where, when and how the oxidation occurs.

In claim 5, it is unclear what is required by "a combustion space through which flow takes place alternately", since there is only one combustion space, it is assumed that the exhaust gas is passed through either a first regenerator or a second or subsequent regenerator (i.e. alternately) before or after the combustion space that is connected to the two or more regenerators.

In claim 6, "removal, purification and re-introduction" should be changed to "removing, purifying and re-introducing" to be consistent with claim 1.

In claim 12, it is unclear what is required by "the step of admixing of natural gas into the exhaust gas, *electrically, via a burner or by gas injection*".

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-8, 10-12, 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2002-061822 in view of Ohlmeyer et al.

JP '822 discloses a method for treating exhaust gas by heat-storage exhaust-gas treating equipment (note title). The exhaust gas to be treated contains organic silicon (note abstract).

JP '822 teaches that at lower temperature, crystal like silicon adheres easily on the surface of the heat storage element to cause blockade (note paragraph [0008]). Therefore, it is known in the art that in order to prevent the blockade, the heat storage element was cleaned periodically (note paragraph [0009]). In the preferred embodiment of JP '822, JP '822 does teach that by heating the combustion chamber to the range of 750-810°C, the formation of crystal like silicon and silica can be prevented (note paragraph [0030]). However, the teaching of JP '822 should not be limited to this preferred embodiment, the prior art method of treating the exhaust gas containing

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organic silicon at using lower temperature (that causes crystal like silicon to adhere on the surface of the heat storage element) with subsequent step for cleaning the heat storage element is still known in the art.

JP '822 discloses that two or more regenerators, which have a heat storage element, can be used to treat the exhaust gas (note the Figure).

It would have been obvious to one of ordinary skill in the art to reuse the heat storage element, after the cleaning step to remove silicon adhesion on the surface of the heat storage element, in order to minimize the cost of fresh heat storage element. The reuse step is considered the same as the claimed "introduction" of the heat storage material.

For the dependent claims, it would have been obvious to one of ordinary skill in the art to optimize the process conditions in the process of JP '822, such as the direction of the flow for the exhaust gas, the timing for the cleaning step, etc. to obtain the best results.

As shown in Figure 1 of JP '822, the heat regenerative element (S), which is contained in the regenerator 4, is considered as a bed since exhaust gas can pass through the heat regenerative element (S).

The difference is JP '822 does not specifically disclose that at least a portion of the heat storage material in the bed is removed, regenerated and returned to the regenerator.

Ohlmeyer '567 discloses a process and apparatus for continuously pre-heating combustion air and catalytically reducing noxious substances in flue gas by using heat

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storage elements (note claim 1). The heat storage elements flow down the apparatus that is considered the same as a moving bed. The heat storage elements are continuously removed and passed through a cleaning device (10) and recycled back (note Figure 1 and column 1 6, lines 41-51).

It would have been obvious to one of ordinary skill in the art to use the heat storage element in JP '822 as a moving bed, as suggested by Ohlmeyer '567 so that the heat storage element could be removed continuously to be cleaned and recycled back to the process thereby enabling a continuous process. Even when the process of JP '822 would be operated in continuous mode, as suggested by Ohlmeyer '567, it would still have been obvious to one skilled in the art to use multiple regenerators so that the extra regenerator(s) can serve as a stand-by regenerator in the case the first regenerator is taken out for service or the extra regenerator(s) can be used in addition to the first regenerator so that each regenerator handles a smaller load of the exhaust gas.

Applicant's arguments filed November 12, 2010 have been fully considered but they are not persuasive.

Applicants argue that JP '822 does not disclose a regenerator with a heat storage material where at least a portion of a heat storage material forms a bed.

In JP '822, the heat regenerative element S (i.e. the heat storage material) as shown in Figure 1 is considered to be in the form of a bed. In any event, Ohlmeyer '567 is applied as stated above to teach the use of a "moving bed" for heat storage elements.

Applicants argue that JP '822 does not disclose the steps b) of removing at least a portion of said heat storage material from said regenerator; c) purifying the heat storage material and d) re-introducing the heat storage material into the regenerator.

As stated in the above rejection, JP '822 does teach the need to clean the heat regenerative element and Ohlmeyer '567 is applied to teach a continuous process for cleaning an analogous heat regenerative element, i.e. steps b)-d) as required in Applicants' claims.

Applicants argue that Ohlmeyer 567 that the heat storage elements are regenerated with respect to its catalytic activity.

Regardless of how the heat storage elements are regenerated and with respect to what property, Ohlmeyer '567 still fairly suggests to one skilled in the art the use of a moving bed of heat storage elements so that the heat storage elements can be continuously removed, regenerated and returned to the process.

Applicants argue that Ohlmeyer '567 does not disclose a) formation of adhesions on said heat storage material and b) removal of the adhesions from the heat storage material.

JP '822 is applied as stated above to teach the formation of adhesions on said heat storage material and the need to remove the adhesions. Ohlmeyer '567 is applied to teach a continuous way to remove, regenerate and recycle the heat storage material. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are

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based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ngoc-Yen M. Nguyen whose telephone number is (571) 272-1356. The examiner can normally be reached on Part time schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Emily Le can be reached on (571) 272-0903. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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/Ngoc-Yen M. Nguyen/  
Primary Examiner, Art Unit 1734

nmn  
January 19, 2011